H-686-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Prior Application: S. IMASU et al
Serial No. 09/048,054
Filed: March 26, 1998

Group Art Unit: 2841
Examiner: J. Vigushin
For: PROCESS FOR MOUNTING ELECTRONIC DEVICE AND SEMICONDUCTOR DEVICE

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 7, line 18, after "board)" insert --of the bump electrodes--.

Page 8, line 2, change "Fig. 4 is sections" to --Figs. 4(A), 4(B) and 4(C) are sectional views--.

Page 8, line 2, change "Fig. 4 is sections" to --Figs. 4(A), 4(B) and 4(C) are sectional views--;

line 25, change "B - B" to --II - II--.

Page 9, line 2, change "C - C" to --III - III--;

line 22, change "A - A" to --I - I--.

Page 22, line 18, after "(a section)." insert --In this case also, as shown in Fig. 11, the passivation film 5 is not formed between the semiconductor chip 10 and the soft layer 3.--

Page 27, line 18, change "B - B" to --II - II--;

line 20, change "C - C" to --III - III--.

IN THE CLAIMS

Cancel claim 1, and add new claims 14-31 as follows:

--14. An electronic device, comprising:

a semiconductor chip having a first surface and a second surface which is opposite to said first surface, a plurality of semiconductor elements and a plurality of external terminals formed on said first surface, a plurality of bumps formed on and electrically connected to said plurality of external terminals, respectively;

a wiring board having a main surface, an insulating layer formed over said main surface, a plurality of conductive films formed on said insulating layer, a passivation film that covers first portions of said plurality of conductive films at the outside of said semiconductor chip;

wherein said semiconductor chip is fixed to said wiring board through an adhesive between said first surface of said semiconductor chip and said insulating layer and said plurality of bumps being electrically connected to second portions of said plurality of conductive films at the inside of said semiconductor chip, respectively; and

wherein a distance between said second portions of conductive films and said first surface of said semiconductor chip is smaller than the thickness of said passivation film.

--15. An electronic device according to claim 14, further comprising recesses in said conductive films, and

wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.

--16. An electronic device according to claim 15, wherein said wiring board is comprised of rigid substrate that is more rigid than said insulating layer.

--17. An electronic device according to claim 14, wherein said plurality of bumps are fixed to said plurality of external terminals and pressed to said plurality of conductive films on said insulating layer.

--18. An electronic device according to claim 14, wherein said insulating layer is made of a material having a smaller coefficient of thermal expansion than that of said adhesive.

--19. An electronic device according to claim 14, wherein said adhesive is made of an anisotropic conductive resin film.

--20. An electronic device, comprising:

a semiconductor chip having a first surface and a second surface which is opposite to said first surface, a plurality of semiconductor elements and a plurality of external terminals formed on said first surface, a plurality

of bumps formed on and electrically connected to said plurality of external terminals, respectively;

a wiring board having a main surface, an insulating layer formed over said main surface, a plurality of conductive films formed on said insulating layer, a passivation film that covers first portions of said plurality of conductive films at the outside of said semiconductor chip;

wherein said semiconductor chip is fixed to said wiring board through an adhesive between said first surface of said semiconductor chip and said insulating layer and said plurality of bumps being electrically connected to second portions of said plurality of conductive films at the inside of said semiconductor chip, respectively; and

wherein a distance between said insulating layer and said first surface of said semiconductor chip at the inside of said semiconductor chip is smaller than a distance between said insulating layer and an upper surface of said passivation film at the outside of said semiconductor chip.

--21. An electronic device according to claim 20, further comprising recesses in said conductive films, and

wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.

--22. An electronic device according to claim 21, wherein said wiring board is comprised of rigid substrate that is more rigid than said insulating layer.

--23. An electronic device according to claim 20, wherein said plurality of bumps are fixed to said plurality of external terminals and pressed to said plurality of conductive films on said insulating layer.

--24. An electronic device according to claim 20, wherein said insulating layer is made of a material having a smaller coefficient of thermal expansion than that of said adhesive.

--25. An electronic device according to claim 20, wherein said adhesive is made of an anisotropic conductive resin film.

--26. An electronic device, comprising:

a semiconductor chip having a first surface and a second surface which is opposite to said first surface, a plurality of semiconductor elements and a plurality of external terminals formed on said first surface, a plurality of bumps formed on and electrically connected to said plurality of external terminals, respectively;

a wiring board having a main surface, an insulating layer formed over said main surface, a plurality of conductive films formed on said insulating layer, a passivation film that covers first portions of said plurality of conductive films at the outside of said semiconductor chip;

wherein said semiconductor chip is fixed to said wiring board through an adhesive between said first surface of said semiconductor chip and said insulating layer and said plurality of bumps being electrically connected to second portions of said plurality of conductive films at the inside of said semiconductor chip, respectively; and

wherein said adhesive directly adheres between said insulating layer and said first surface of said semiconductor chip at the inside of said semiconductor chip.

--27. An electronic device according to claim 26, further comprising recesses in said conductive films, and wherein said plurality of bumps are electrically connected to said plurality of electrode pads in said recesses, respectively.

--28. An electronic device according to claim 27, wherein said wiring board is comprised of rigid substrate that is more rigid than said insulating layer.

--29. An electronic device according to claim 26, wherein said plurality of bumps are fixed to said plurality of external terminals and pressed to said plurality of conductive films on said insulating layer.

--30. An electronic device according to claim 26, wherein said insulating layer is made of a material having a smaller coefficient of thermal expansion than that of said adhesive.

--31. An electronic device according to claim 26, wherein said adhesive is made of an anisotropic conductive resin film.--

REMARKS

Claims 1-13 have been canceled. Claims 14-31 are pending.

Examination is requested.

Respectfully submitted,

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REQUEST FOR APPROVAL OF PROPOSED DRAWING CORRECTIONS

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

The applicants request approval of the proposed drawing corrections as noted on the attached copies of Figs. 1 and 14.

The changes to these figures were requested in the Notice of Draftperson's Patent Drawing Review forwarded with the Office Action dated December 29, 1999 in the parent application, 09/048,054.

Accordingly, the requested changes should be approved.

Applicants submit herewith corrected formal drawings (Figs. 1 and 14) incorporating these changes.

Respectfully submitted,

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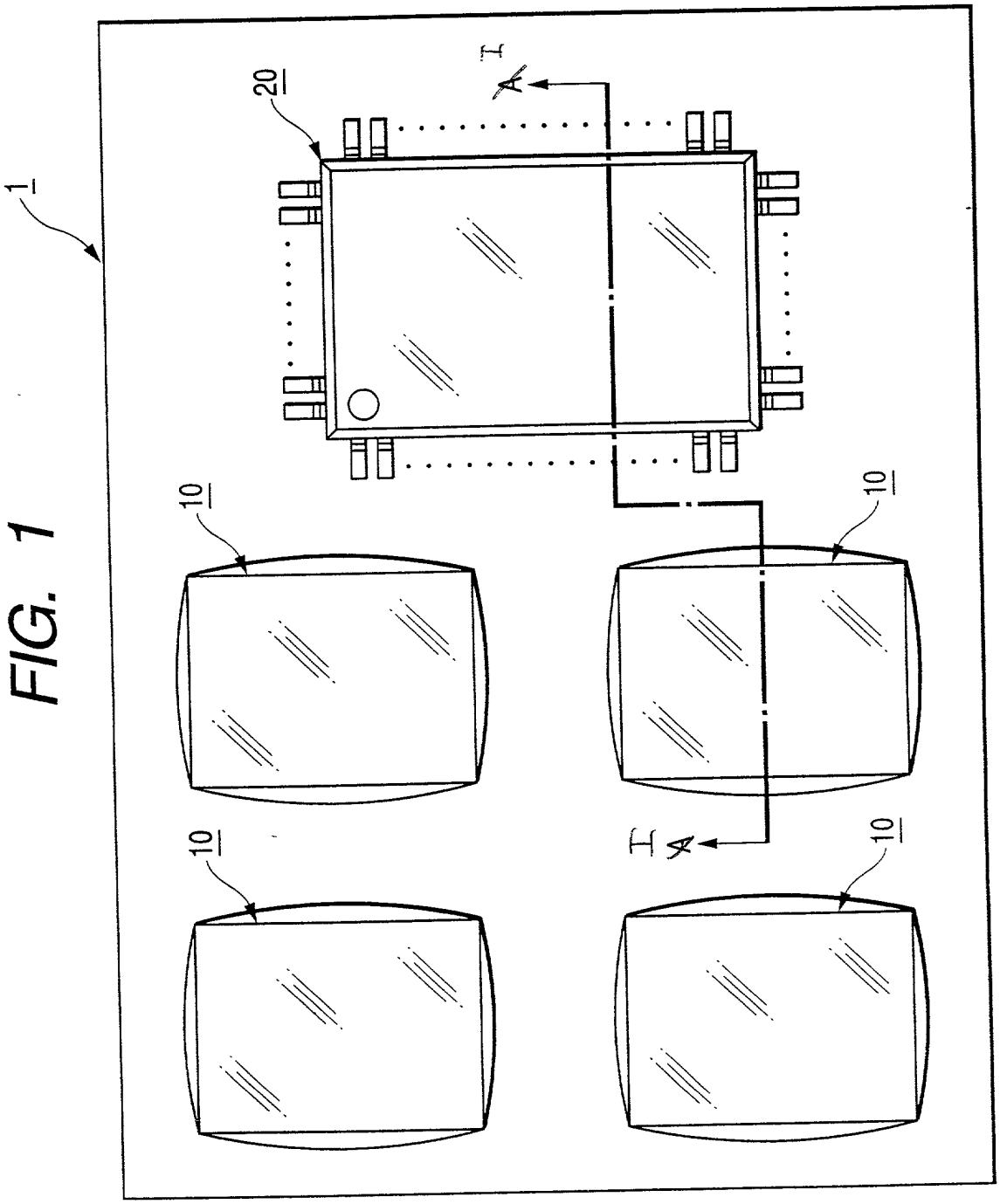
FIG. 1



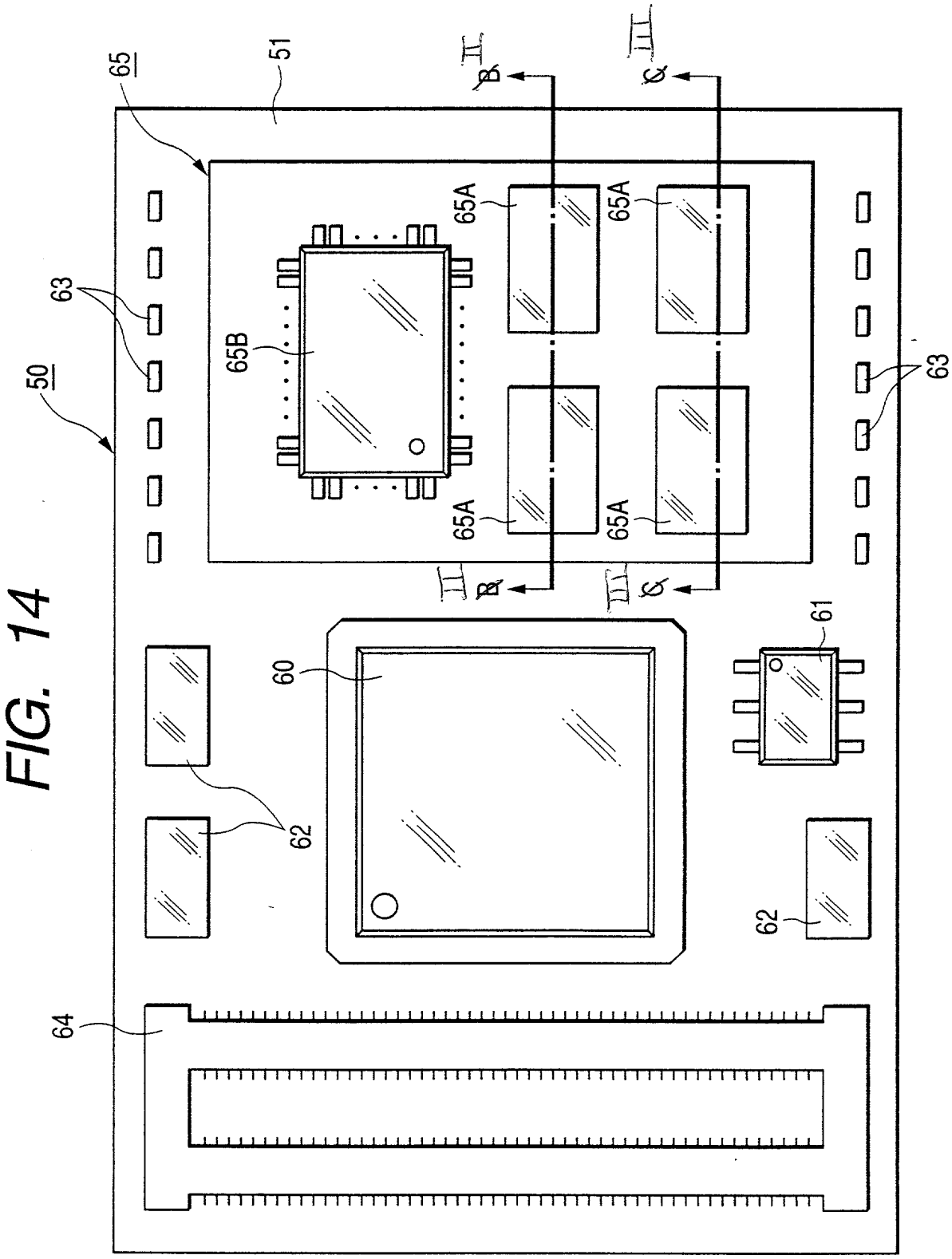


FIG. 14

FIG. 1

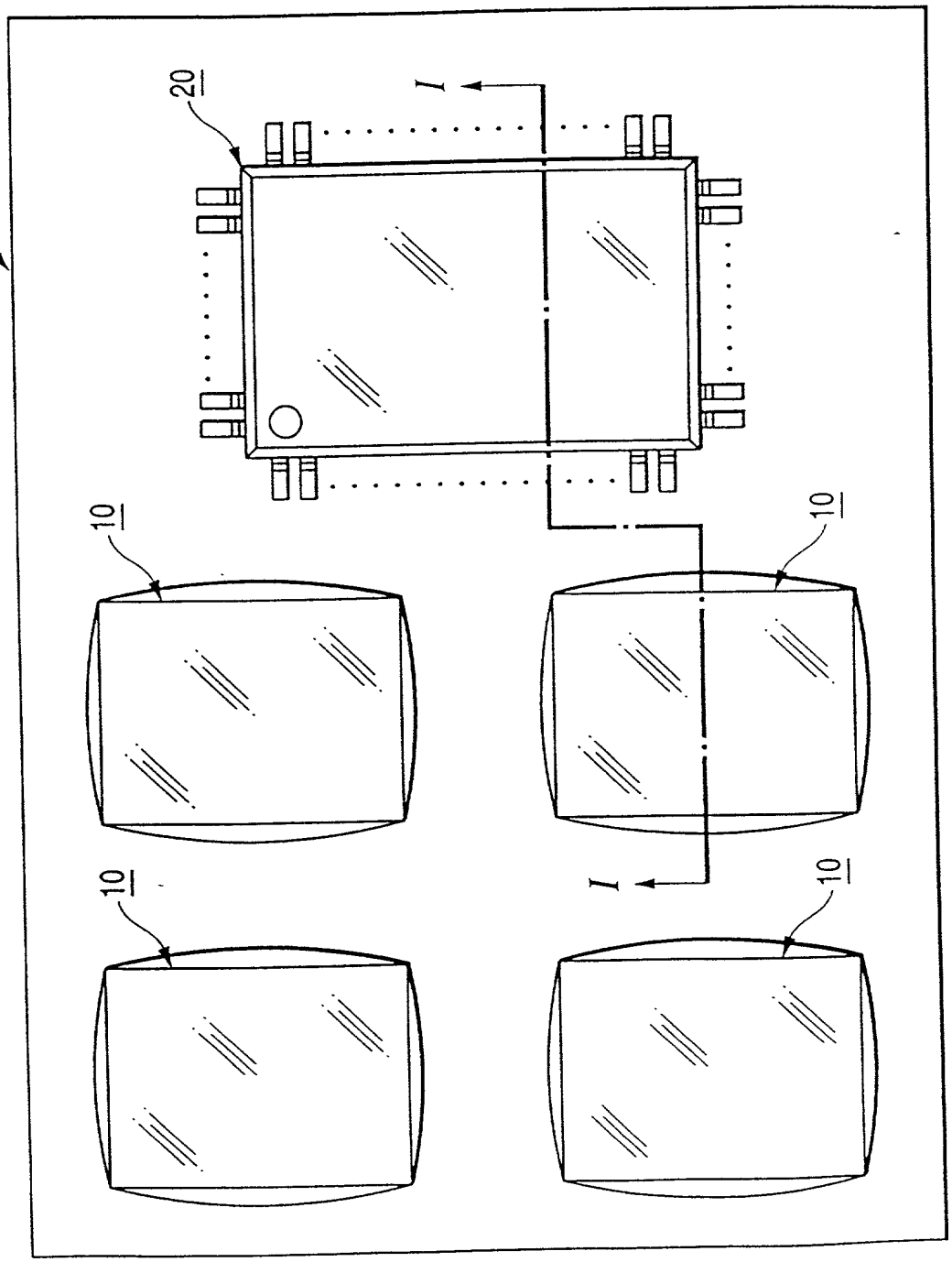
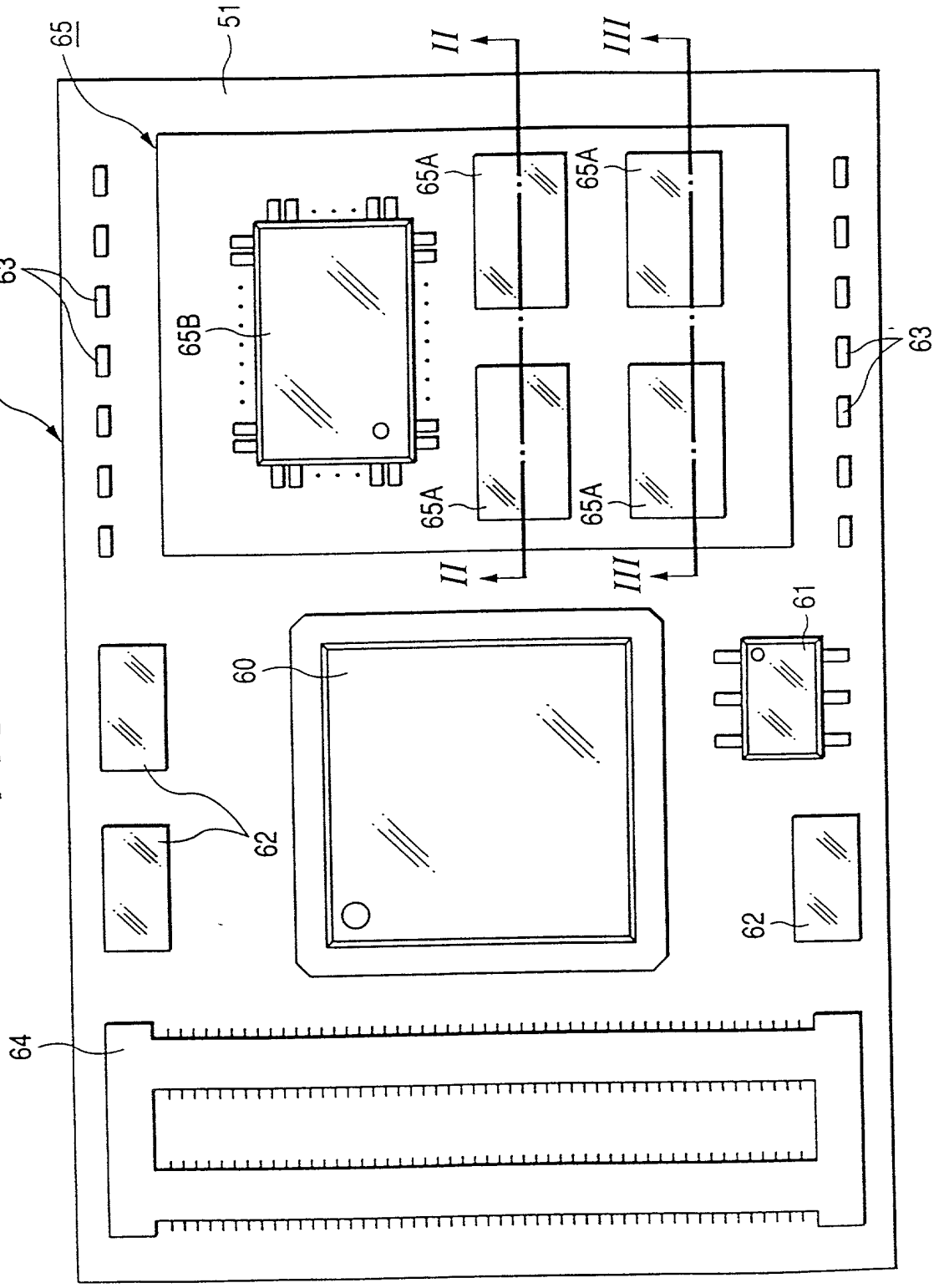


FIG. 14



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